Amendments to Specification

Please replace the first two paragraphs on page 1 of the specification as follows:

FIELD OF THE INVENTION:

The present invention relates to the field of graphic visualization tools and, more particularly, to three-dimensional representations of multi-domain measurements of system operation.

BACKGROUND OF THE INVENTION

Signals acquired from relatively simple systems can be viewed and understood using two-dimensional graphing techniques that represent electrical activity at one or more nodes in a circuit under test. Testing of more complex systems requires that many nodes (often hundreds) be viewed, and the information content and different timing relationships of these signals must be presented to the user.

Please replace the first paragraph on page 2 as follows:

A method according to one embodiment of the invention comprises receiving a plurality of sample streams representing respective signal measurements; temporally aligning the sample streams; and generating waveform data associated with the temporally aligned sample streams, the waveform data representing sample magnitudes as a function of time and including Z-axis information adapted to illustrate at least one inter-stream timing relationship.

Please replace the last paragraph on page 4 as follows:

The Controller **170** controls the operation of Signal Analysis Functions **120**, Time Base Controller **130**, Trigger Controller **140** and[,] Optional Input Selection Module **110**, if present. Controller **170** comprises a Processor **176** and a Memory **178** for storing various control programs and other programs **178-P** as well as data **178-D**. Memory **178** may also store an operating system **170-OS** such as the Windows® operating

system manufactured by Microsoft Corporation of Redmond, Washington. Other operating systems, frameworks and environments suitable for performing the tasks described herein will also be appreciated by those skilled in the art and informed by the teachings of the present invention. For example, Apple®, MacIntosh® operating systems, various UNIX-derived operating systems and the like also support functions such as those discussed herein.

Please replace the four paragraphs starting at the top of page 7 and extending over to page 8 as follows:

System **100** of FIGURE 1 finds practical application in many test and measurement scenarios. For example, in one scenario an oscilloscope, a logic analyzer and a spectrum analyzer are used to measure or characterize the operation of a computer interface, such as a Bluetooth channel, a WiFi channel or an Ethernet channel. The techniques discussed herein are also applicable to other communications media and methodologies, such as satellite channels, hybrid fiber coax channels, [a] wireless LAN channels and the like. The radio frequency (RF) domain is monitored by the spectrum analyzer to identify noise or other spectral anomalies that might be disruptive to data flow via the wireless computer interface. The analog domain is monitored by the oscilloscope to view the modulated logic signal that is being transmitted via the wireless computer interface. The digital domain is monitored by the logic analyzer to examine the digital packets that are reconstructed after reception via the wireless computer interface. One skilled in the art will quickly realize that the subject invention is extremely useful for clearly showing the relationship between measurements from all three measurement domains.

For example, it is useful to identify, or at least view, the relationship between a noise spike occurring in the RF domain and a packet error occurring in the digital or information domain. To facilitate such analysis, the subject invention renders these three complex domains in a manner that is readily accessible to a viewer. That is, the acquired sample streams representing measurements made in the three domains are temporally aligned and combined to provide waveform data in which analog and digital domain information are displayed within the XY coordinate system of an oscilloscope

display, while spectral information is displayed on the Z-axis. Other use of the XYZ coordinate systems may also be employed. Of particular use is the ability to render a manipulable two-dimensional or three-dimensional display in which waveform data ~~drive~~ derived from each of the three domains is represented.

Thus, as discussed herein, one embodiment of the invention is the application of three-dimensional representations of multi-domain measurements of system operation in which one or more of an oscilloscope graph, a logic analyzer trace, a packet representation and a frequency spectrum waterfall image are combined into a single three-dimensional display with one axis being time, a second being measurement domain, and a third being intensity or content of the measured phenomena. The tools of three-dimensional graphics are applied to provide viewing position, perspective and artificial colorization or intensity gradation to highlight areas of interest.

Three-dimensional representation may be provided using holographic imagery, binocular vision and other techniques. Similarly, a third dimension may be represented using a two-dimensional display such as a perspective or isometric view. The two-dimensional representation may be fixed in perspective or manipulable by a user. By providing multiple domain waveform representations, inter-stream timing relationships, such as the timing relationship between a noise spike and ~~a data correction~~ data corruption in the above example, may be established and displayed.

Please replace the first two full paragraphs on page 10 as follows:

At step **250**, the waveform data for display is adapted in response to user manipulation. For example, a two-dimensional ~~orthagonal~~ orthogonal (i.e., "stacked") display simulating a three-dimensional display may be translated into a perspective view of the displayed waveform data, by user manipulation of an XYZ vector icon. Similarly, a waveform display having a three-dimensional perspective view may be adapted (i.e., translated or rotated) by a user, as desired.

FIGURES 3, 4, and 5 are graphical representations of screen displays useful in understanding the present invention. FIGURE 3 shows a screen display of two precisely time-aligned, overlapped (i.e., "stacked") sine waves. In such a display, it can be said that a Z-axis is present, but provides no viewing perspective to a user because

the Z-axis of the display is perpendicular to the user's ~~filed~~ field of view. The two overlapping sine waves of FIGURE 3 become distinct when the viewing perspective is "tilted" as shown in FIGURE 4. Thus, the XY coordinate representation shown in FIGURE 3 becomes an XYZ coordinate representation in FIGURE 4, by translating one of the screen displays in the X and Y axes with respect to the other screen display. Similarly, the screen display of FIGURE3 can be transformed into a perspective view by use of well-known graphical image rotation methods. FIGURE 5 is a composite representation of a repetitive pulse signal and a sine wave signal having a perspective view similar to that of FIGURE 4 such that additional spatial separation is provided.

Please replace the second full paragraph on page 11 as follows:

FIGURE 7 is an orthogonal screen view showing the same information as the perspective view of FIGURE 6. In FIGURE 7, the X-axis represents TIME, the Y-axis represents MAGNITUDE for the Analog Domain waveform 710 and the Logic Domain waveform **720**, but represents FREQUENCY for the spectra of the Frequency Domain. In FIGURE 7, the Z-axis applies to the Frequency Domain only, and is arranged such that it is perpendicular to the screen display and pointed directly toward the viewer. Thus, the spectra **730a** through **730f** are rotated such that viewer is looking directly down the Z-axis onto the tops of the individual energy spikes. In this example, the relative magnitudes of each of the energy spikes is shown by color (denoted by different cross hatching). Note that the spur **735** is more readily observable in the example of FIGURE 7 than it is in the example of FIGURE 6. In the examples shown in both FIGURES 6 and 7 the spur is substantially the same magnitude as the center frequency component. Note also that the dotted line shows that spectrum ~~**730d**~~ **730c** is time-aligned with glitch **715**, and anomaly **725**.